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MACTEC ENVIRONMENTAL RESTORATION SERVICES, LLC

Spectral Gamma-Ray Borehole
Log Data Report

Log Event A

Borehole # 40-12-02

Borehole Information

Farm : S	**Tank :** S-112	**Site Number :** 299-W23-174
N-Coord : 35,952	**W-Coord :** 75,837	**TOC Elevation :** 663.92
Water Level, ft :	**Date Drilled :** 10/31/1971	

Casing Record

Type : Steel-welded	Thickness : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 100	

Borehole Notes:
This borehole was drilled in October 1971 and completed at a depth of 100 ft with 6-in.-diameter steel casing. The driller's log makes no mention of the casing being perforated or grouted; therefore, it is assumed that the casing was not perforated or grouted. The casing thickness is assumed to be 0.280 in., on the basis of published thickness of schedule-40, 6-in. steel tubing.

Equipment Information

Logging System : 1	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 04/1996	**Calibration Reference :** GJPO-HAN-5	**Logging Procedure :** P-GJPO-1783

Log Run Information

Log Run Number : 1	**Log Run Date :** 07/30/1996	**Logging Engineer:** Kim Benham
Start Depth, ft.: 99.5	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 40.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

Log Run Number : 2	**Log Run Date :** 07/31/1996	**Logging Engineer:** Kim Benham
Start Depth, ft.: 41.0	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 0.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

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Borehole 40-12-02

Analysis Information

Analyst : H.D. Mac Lean

Data Processing Reference : P-GJPO-1787 Analysis Date : 05/21/1997

Analysis Notes :

The SGLS log of this borehole was completed in two logging runs. A centralizer was used for both runs. The pre- and post-survey field verification spectra for both logging runs met the acceptance criteria established for peak shape and system efficiency. The energy and peak-shape calibration from the field verification spectra that best matched the spectra acquired during the logging runs were used to establish the channel-to-energy parameters used in processing these data. There was negligible gain drift during the logging runs and during processing of the log data; it was not necessary to adjust the established channel-to-energy parameters to maintain proper peak identification.

Casing correction factors for a 0.280-in.-thick casing were applied during the analysis.

Cs-137 was the only man-made radionuclide detected in this borehole. This contaminant was detected only the ground surface at an apparent concentration of approximately 12 pCi/g.

The KUT concentration plot shows a relative increase in the K-40 concentration between 48 and 54 ft and a relative decrease from 54 to 63 ft. The U-238 and Th-232 concentrations decrease between 58 and 63 ft. Below a depth of 63 ft, the KUT concentrations increase to a generally higher background.

Details concerning the interpretation of data for this borehole are presented in the Tank Summary Data Report for tank S-112.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.